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B41J 29/40

(52) UK CL (Edition J)

G4H HQD H1A H13D

(56) Documents cited

EP 0131966 A2 EP 0119720 A2

(58) Field of search

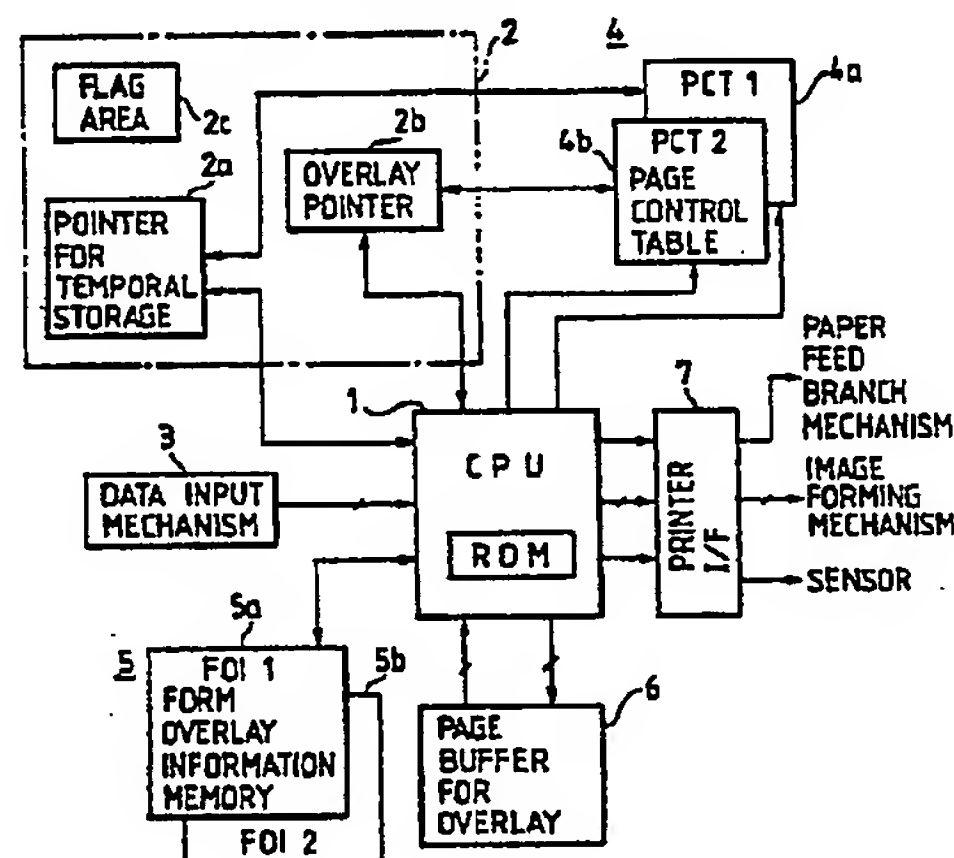
UK CL (Edition J) G4H HQD HTAG HTAR HTAT

INT CL<sup>4</sup> B41J, G06F, G06K

(54) Recording control apparatus

(57) An apparatus for effectively controlling the overlay recording on one side or both sides of a sheet, has a data input unit 3, a first memory for storing format data, an output unit for overlaying the data from the input unit with the format data of the first memory, and a second memory for storing the prior format data in introducing new format data into the first memory, thereby preventing the loss of format data at the shifting of overlay format.

FIG. 1



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1/7

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FIG. 1

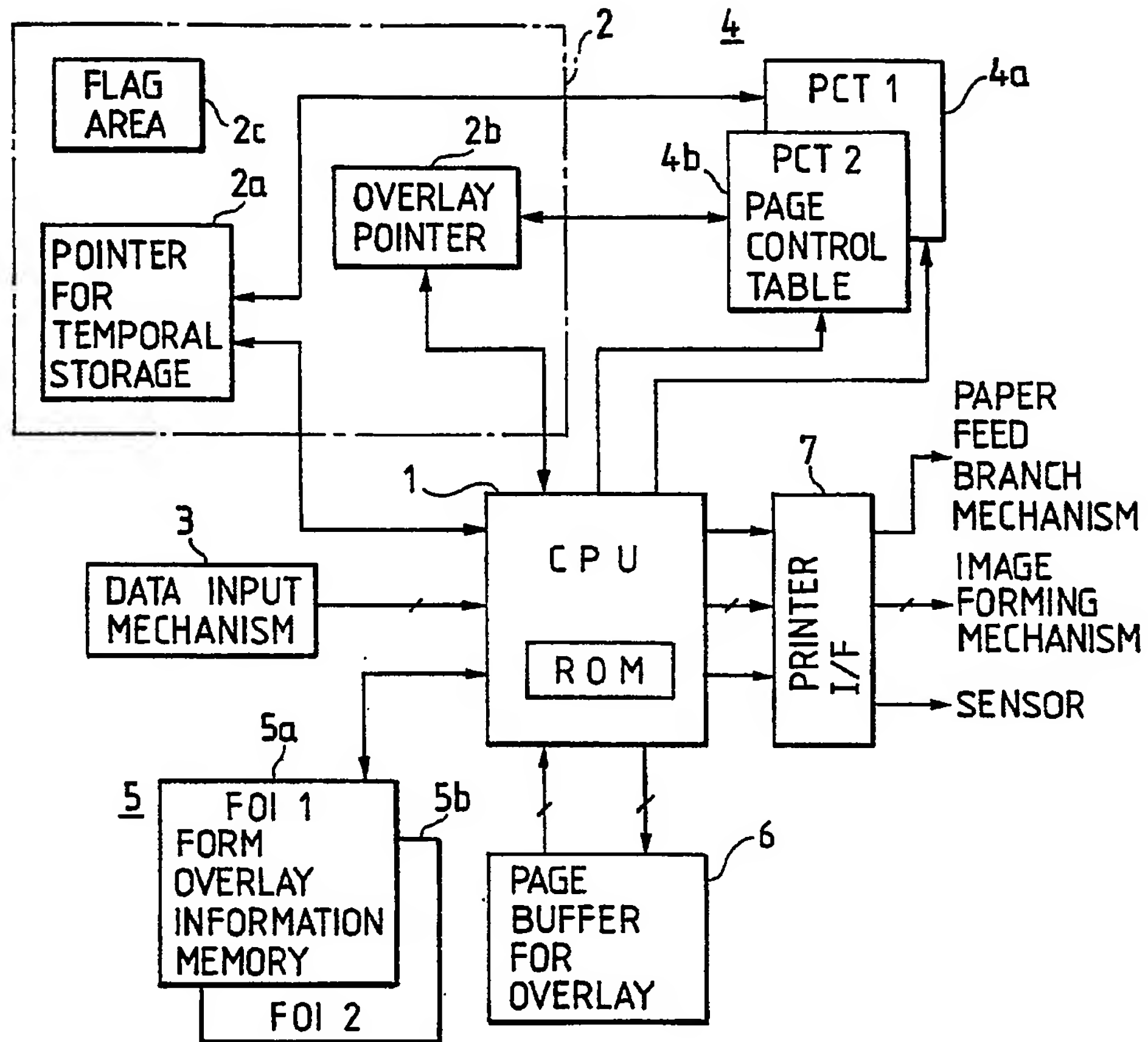


FIG. 2

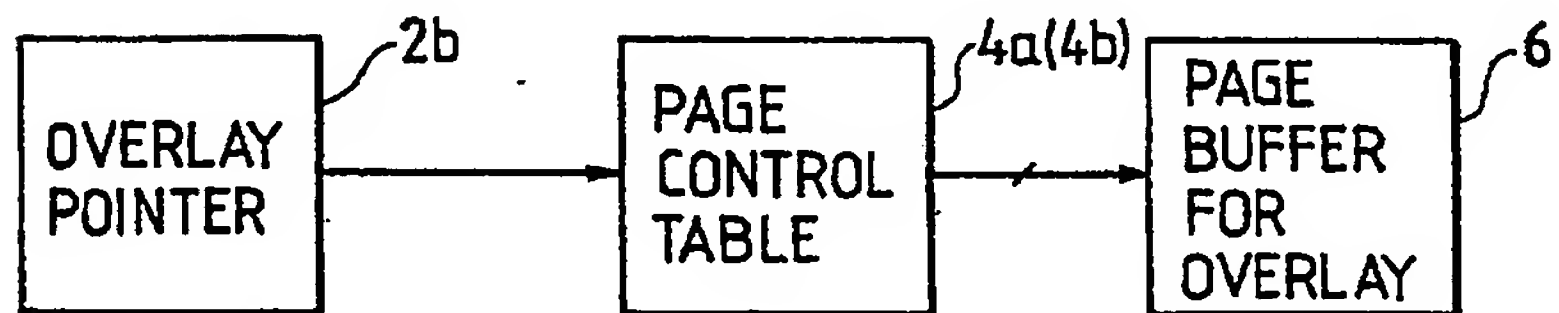


FIG. 3A

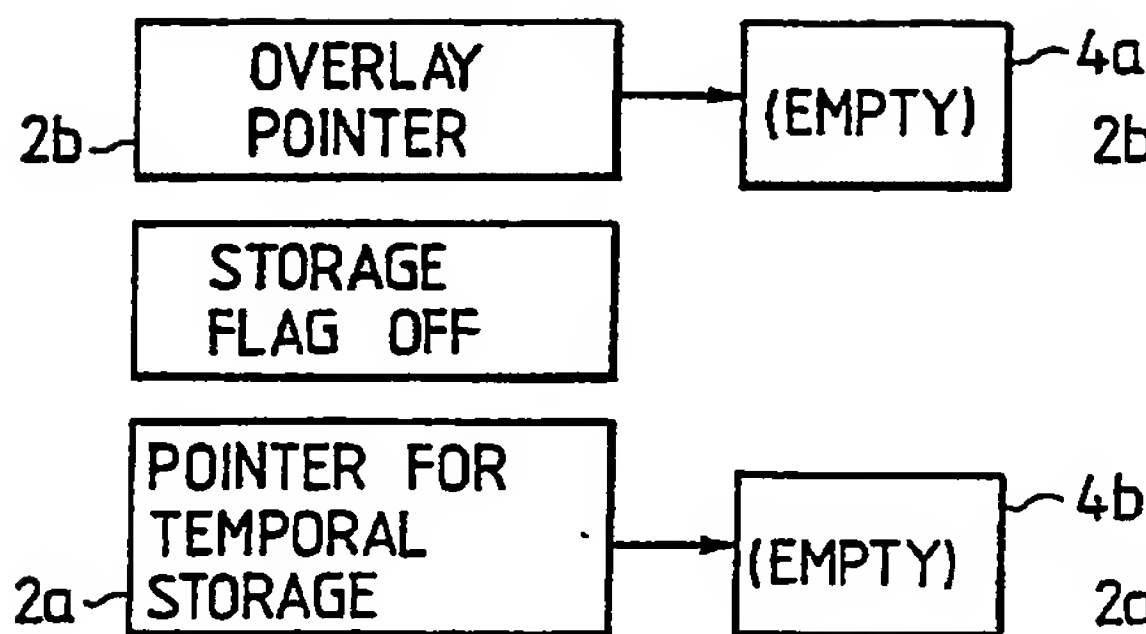


FIG. 3B

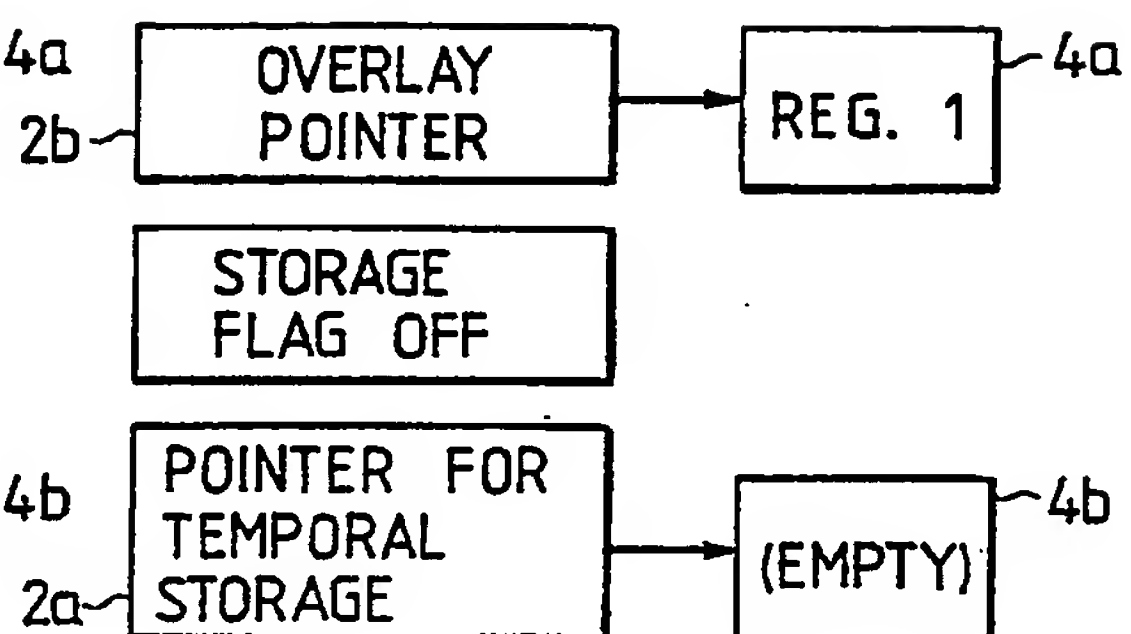


FIG. 3C

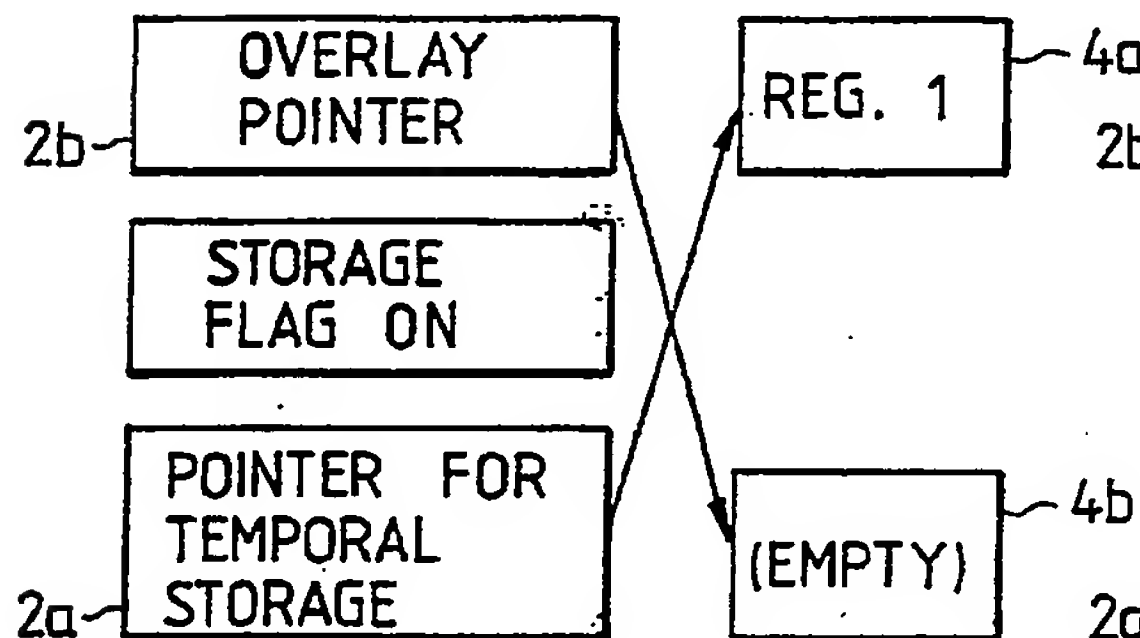


FIG. 3D

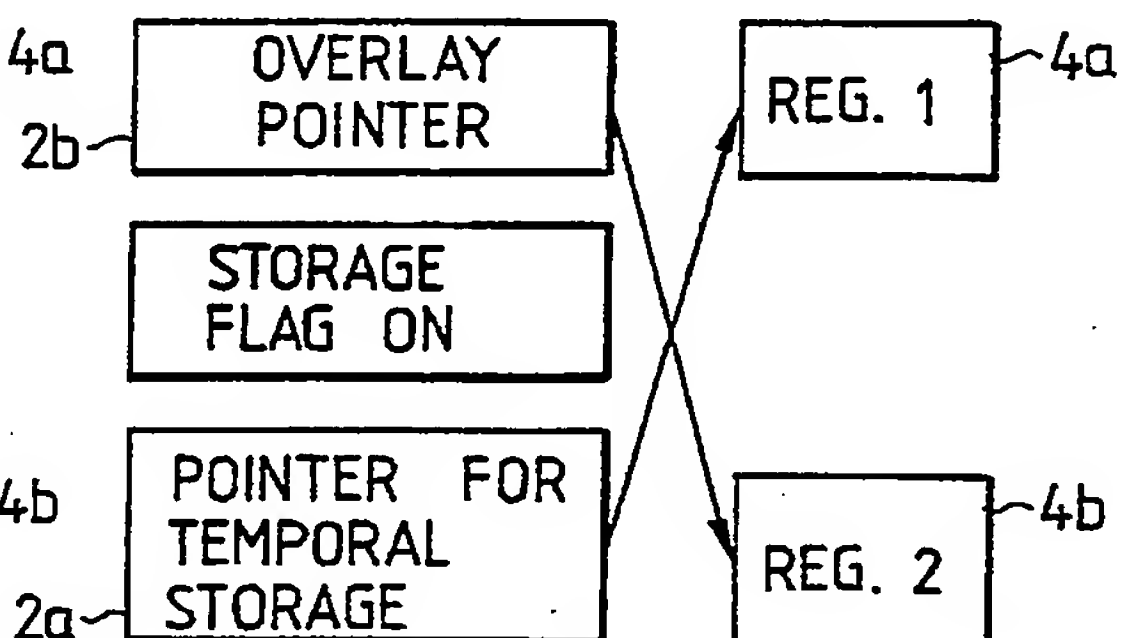
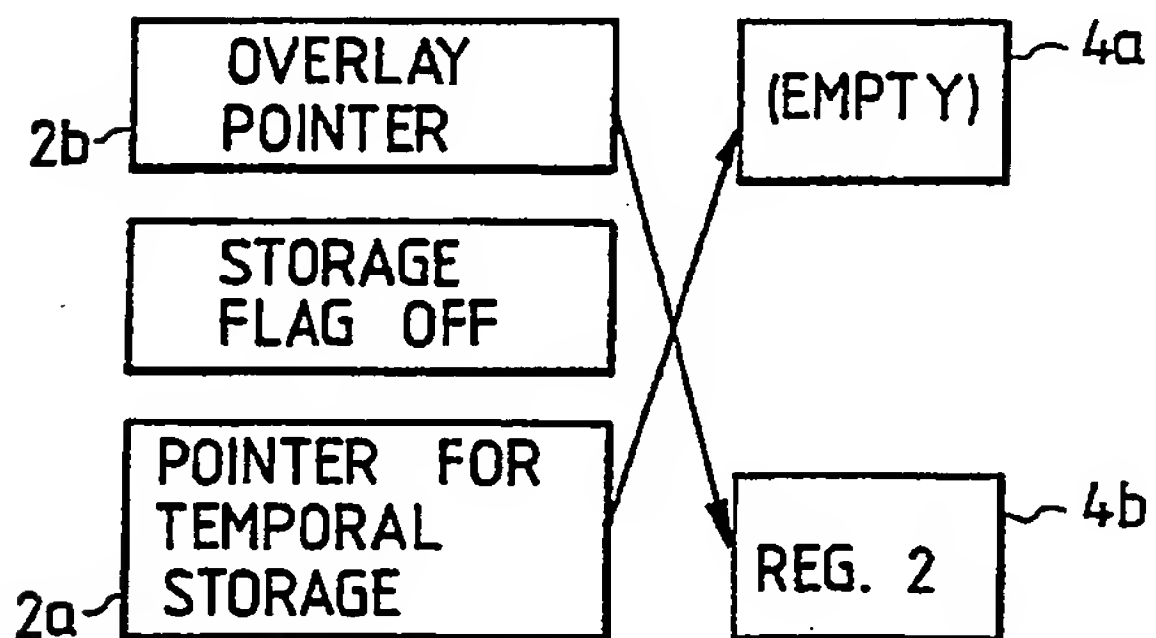


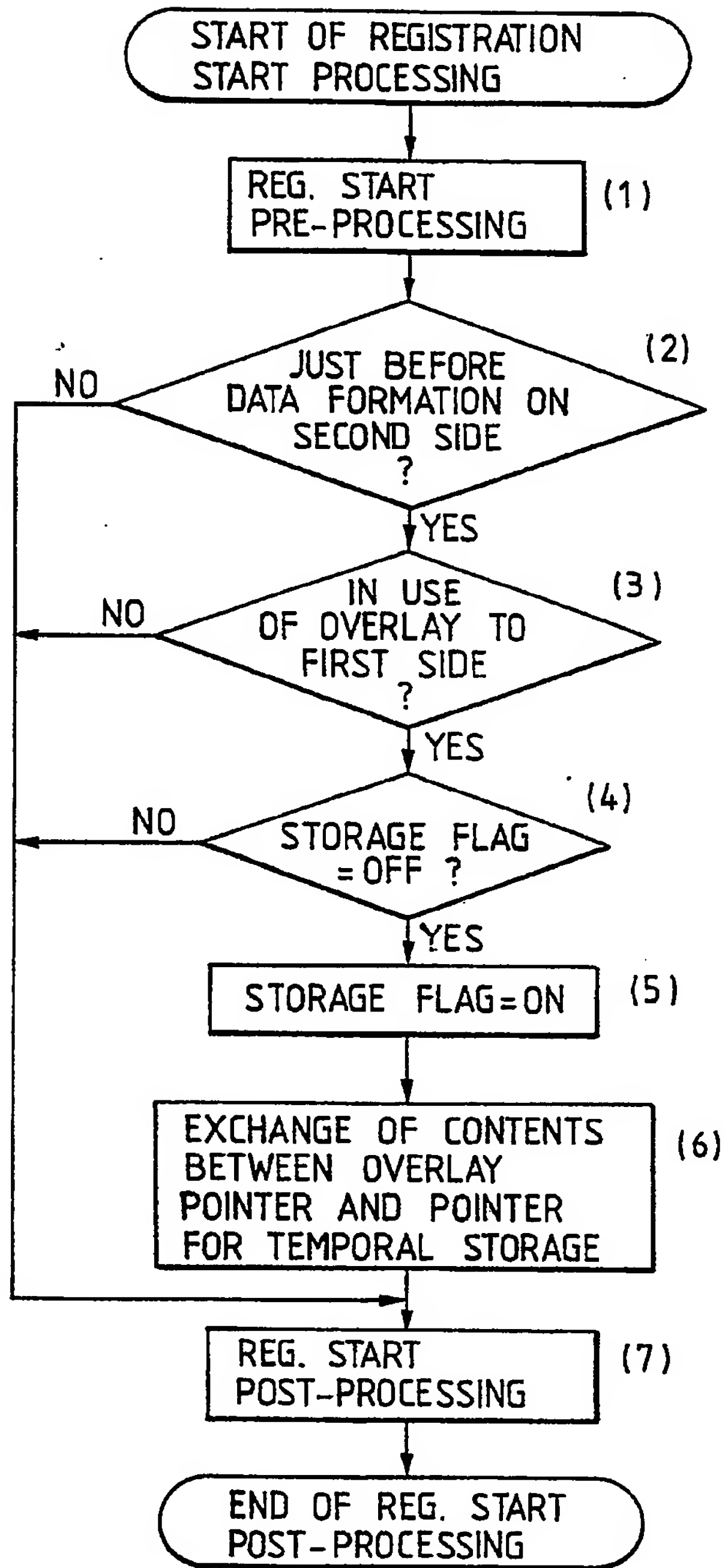
FIG. 3E



3/7

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FIG. 4



4/7

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FIG. 5

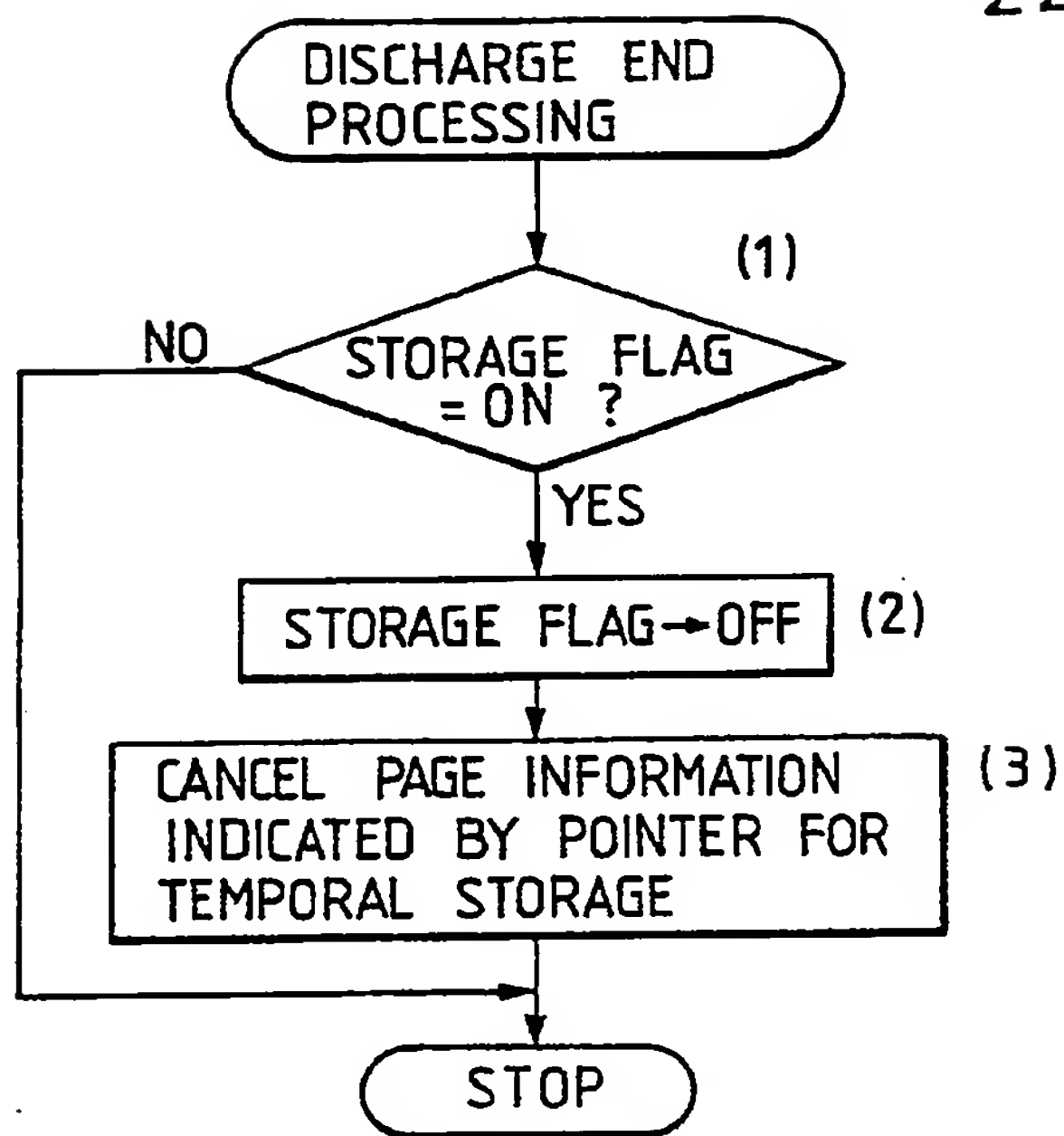
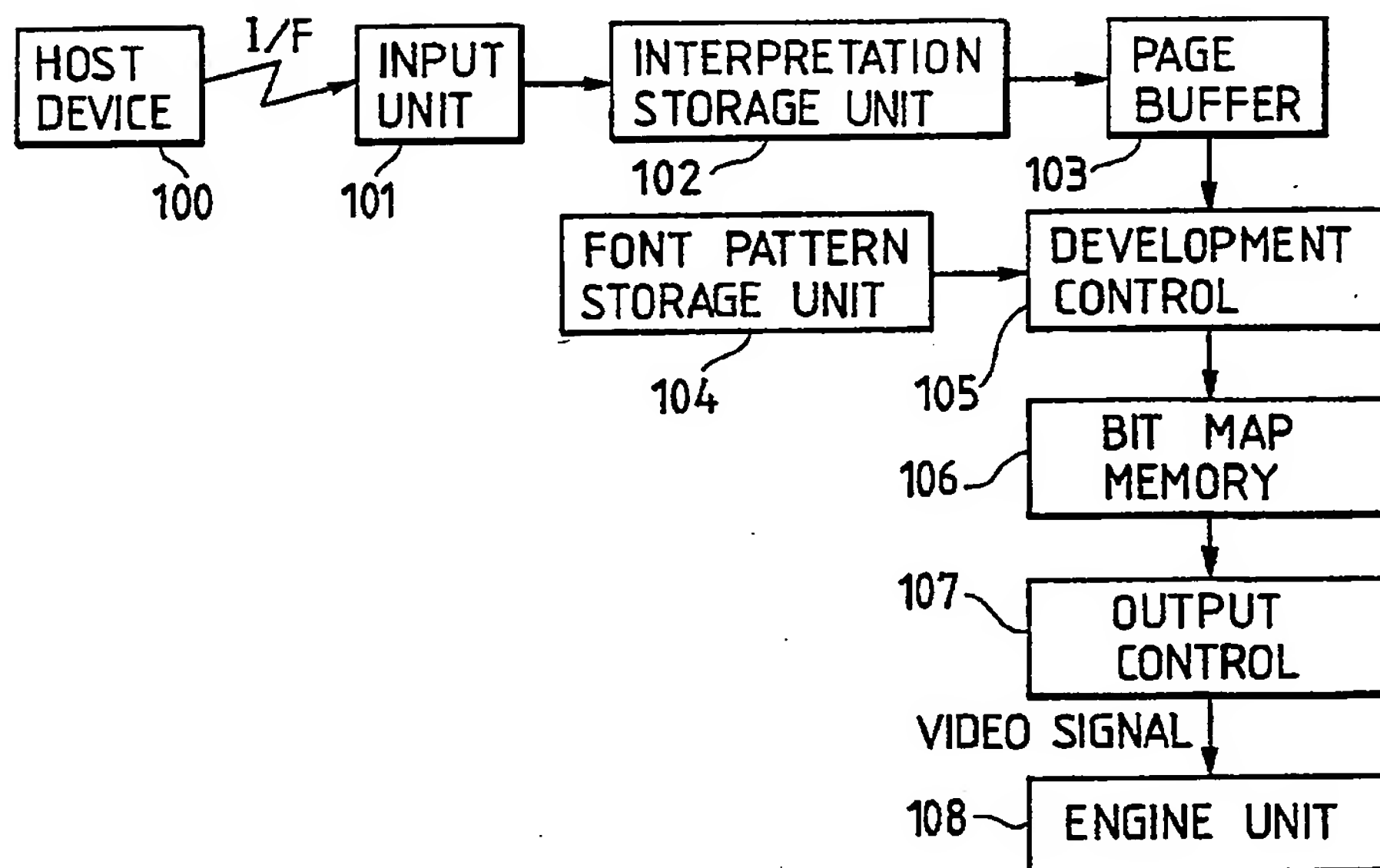
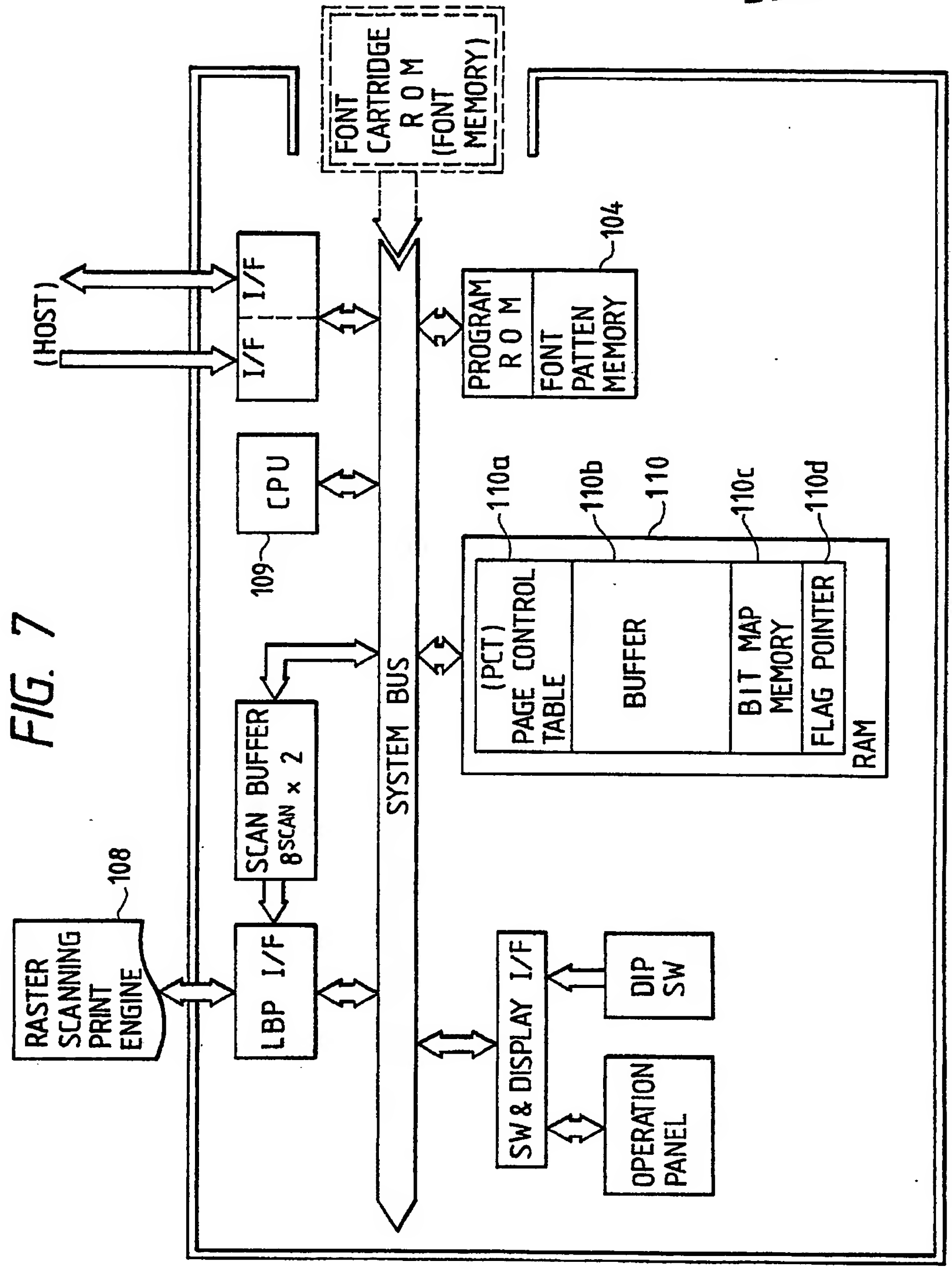


FIG. 6



5/7

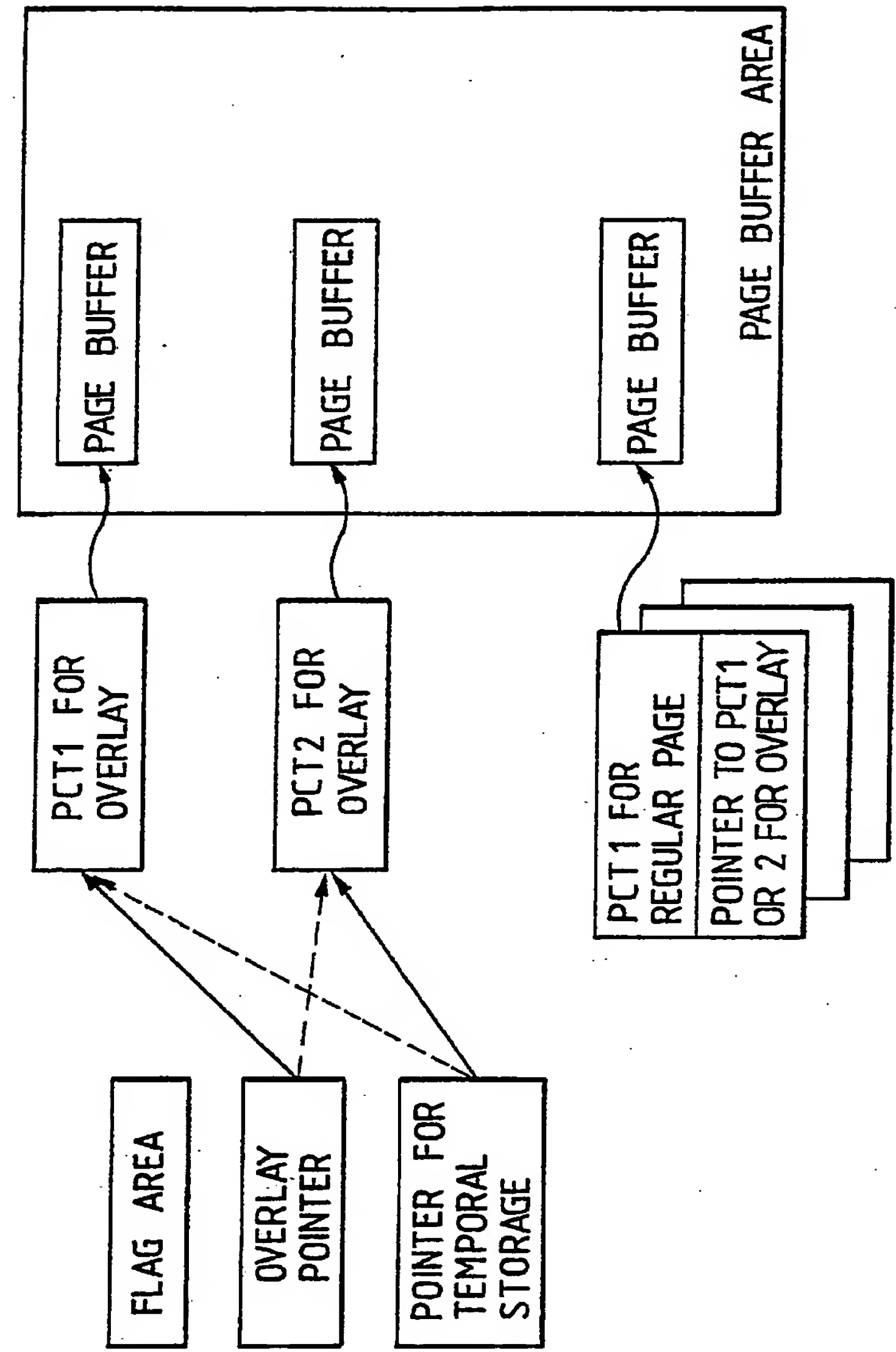
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6/7

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FIG. 8



7/7

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FIG. 9

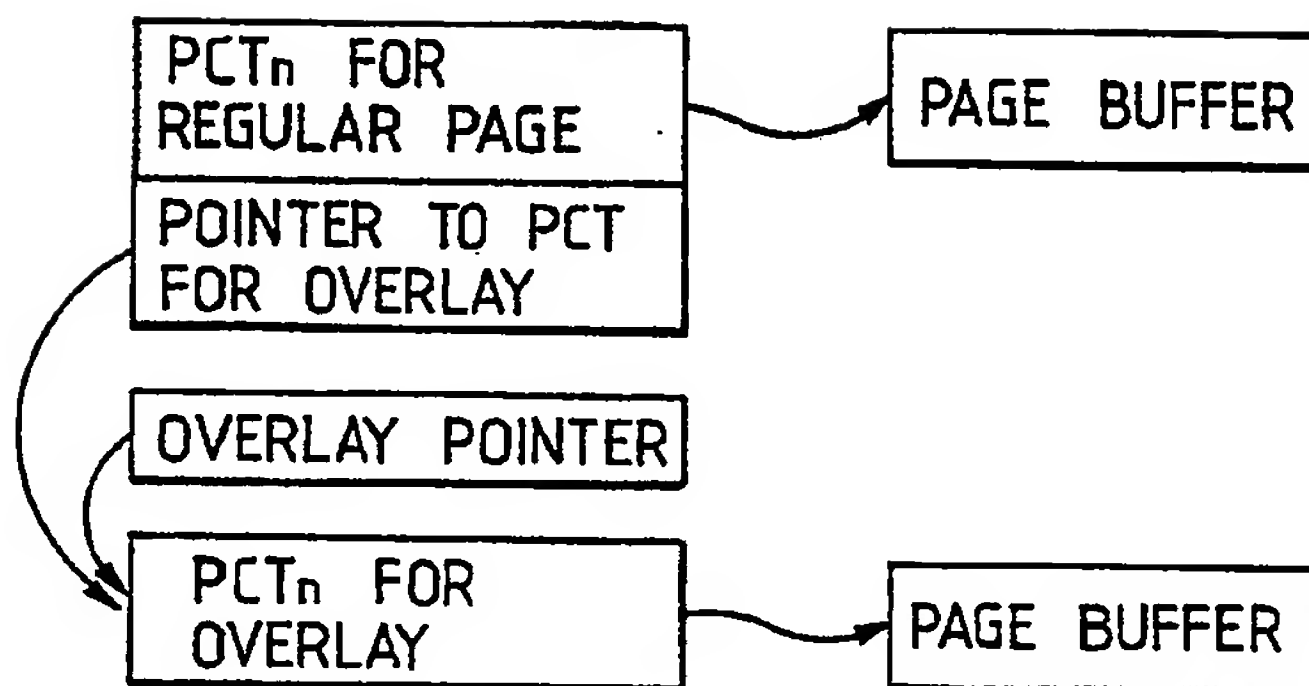
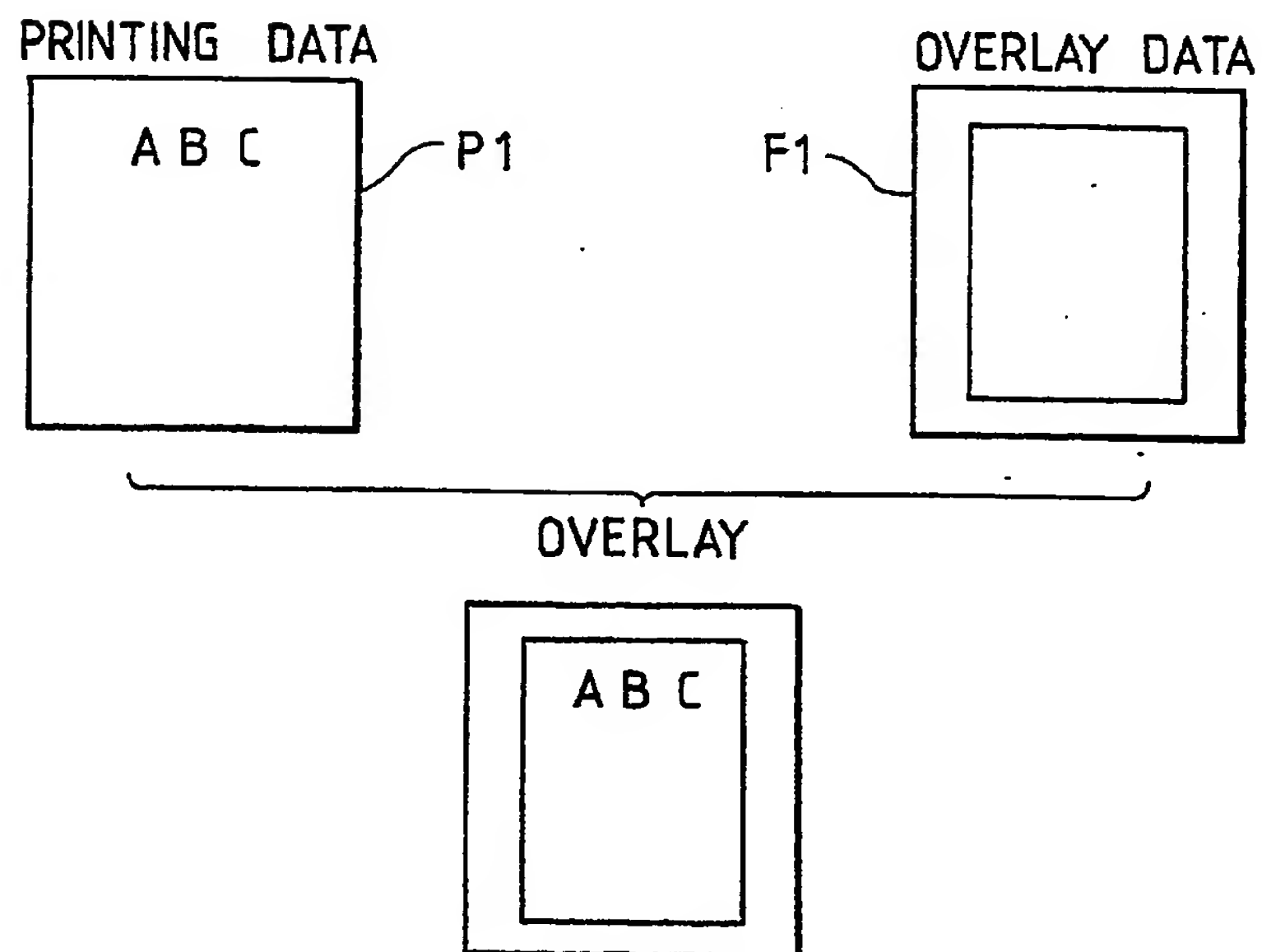


FIG. 10





1 TITLE OF THE INVENTION

Recording Control Apparatus

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BACKGROUND OF THE INVENTION

5 Field of the Invention

The present invention relates to an apparatus for controlling overlay recording in which plural images are overlaid in recording.

Related Background Art

10 There is already proposed a two-side printing apparatus capable of temporarily storing the input print data and selectively printing said data on one face or both faces of a transported sheet-shaped recording medium.

Also there is proposed a two-side printing  
15 apparatus provided with form overlay function for overlaying input print data P1 with a fixed format F1 of an account book, a slip or the like, as shown in Fig. 10. In the conventional one-side printing apparatus, the overlay format can be registered between the data  
20 of pages, namely immediately after the feeding of form sheet or after the resetting operation. However, in the two-side printing apparatus, the printing operation is possible only when the data are prepared for the first and second faces due to the restriction  
25 on the structure of the apparatus. Thus, when the overlay format registered for the first face is registered for the second face, the already registered overlay format

1 is erased and replaced by a new format, so that the intended result cannot be obtained.

SUMMARY OF THE INVENTION

5 In consideration of the foregoing, an object of the present invention is to provide a recording control apparatus capable of precise overlay recording on a recording material.

Another object of the present invention is to  
10 provide a recording control apparatus capable of efficient overlay recording on both sides of a recording material.

Still another object of the present invention is to provide a recording control apparatus capable of  
15 secure administration of recording information in the overlay recording on both sides of a recording material.

Still another object of the present invention is to provide a recording control apparatus capable, in forming images by overlaying the stored format  
20 information on both sides of the recording material, of storing the overlay format for the first face and that for the second face individually according to the state of printing on both sides, thereby efficiently effecting the printing on both sides with overlay formats  
25 on respectively sides while preventing the loss of or alteration in the overlay format.

Still another object of the present invention

1 is to provide a recording control apparatus capable,  
in overlay recording on both sides, of preventing loss  
of or alteration of the already registered overlay data  
even if the registration of the overlay information is  
5 executed immediately before the start of recording on  
respective sides.

The foregoing and still other objects of the  
present invention, and the advantages thereof, will  
become fully apparent from the following description  
10 to be taken in conjunction with the attached drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a two-side printing  
apparatus embodying the present invention;

15 Fig. 2 is a schematic view showing instruction  
of writing into a page control table shown in Fig. 1;

Figs. 3A to 3E are views of states of  
registration showing the registration of format  
information according to the present invention;

20 Fig. 4 is a flow chart showing an example of  
overlay format registration according to the present  
invention;

Fig. 5 is a flow chart showing an example of  
a sheet discharge ending process according to the  
25 present invention;

Fig. 6 is a schematic view showing an example  
of overlay printing operation;

1           Fig. 7 is a view showing the flow of data in  
another embodiment of the present invention;

          Fig. 8 is a block diagram of a control unit  
shown in Fig. 7 for data control;

5           Figs. 9 and 10 are views showing a format  
information registration process.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

          Fig. 1 is a block diagram of a two-side printing  
10   apparatus embodying the present invention, in which a  
CPU 1 collectively controls the reception of print  
information and the supply of print information to a  
printer, according to a control program stored in a ROM.

          An administration information memory 2, composed  
15   for example of a RAM, is provided with a temporary storage  
pointer 2a, an overlay pointer 2b, and a flag area 2c.  
The overlay pointer 2b functions as instruction means,  
for instructing, in succession, the registration of  
overlay information in page control tables 4a, 4b of a  
20   page control table flag area 4 constituting form  
information memory means. An overlay form information  
memory unit 5 is composed for example of overlay form  
information memories 5a, 5b storing fixed format images  
to be overlaid in the two-side printing. An overlay  
25   page buffer 6 is composed of a bit map memory, and  
serves to store the image data corresponding to the  
printing information entered from a data input mechanism

1     3, and arbitrary fixed format image information stored  
in the overlay format information memories 5a, 5b and  
page control tables 4a, 4b in overlaid manner and to  
be subjected to data reading under the control of the  
5     CPU 1 for supply of the overlaid image data to an image  
forming mechanism through a printer interface 7.

When arbitrary format information to be developed  
in the overlay page buffer 6 are stored in the page  
control tables 4a, 4b serving for storing plural format  
10    information, the CPU 1 selects, in succession, the format  
information stored in one of said page control tables  
4a, 4b and develops the selected format information in  
the overlay page buffer 6, in overlay with the print  
information developed therein.

15           When the destinations of storage are designated  
by the overlay pointer 2b in succession, in response  
to the request for storage of format information  
into the page control tables 4a, 4b, the CPU 1  
independently administers the format information stored  
20    in a page control table 4a designated as first and that  
stored in the other page control table 4b designated  
as second, thereby maintaining the order of storage.

Also when the CPU 1 administers the format  
information stored in a page control table 4a by the  
25    temporary storage pointer 2a, the CPU 1 gives priority  
to the storage in response to the request for storage  
of the format information into the page control table

1 4a, in comparison with that into the other page control  
table 4b, thereby temporarily storing the format  
information already stored in said page control table  
4a. Then, after the two-side printing operation, the  
5 temporary storage pointer 2a is cleared, and the content  
of the page control table 4a is cleared.

Fig. 2 is a schematic view showing the storage  
instructions into the page control tables 4a, 4b shown  
in Fig. 1, wherein same components as those in Fig. 1  
10 are represented by same numbers.

Figs. 3A to 3E are views of states of  
registration, showing the process of format information  
registration according to the present invention, wherein  
same components as those in Fig. 1 are represented by  
15 same numbers. In the following there will be explained  
the above-mentioned process.

At first, Fig. 3A shows a state prior to the  
preparation of the print data for the first face.  
In this state the page control table 4b designated by  
20 the temporary storage pointer 2a and the page control  
table 4a designated by the overlay pointer 2b do not  
have the page buffer and are therefore open. Naturally  
the storage flag (set in the flag area 2C) is turned  
off.

25 If an overlay registration is conducted in this  
area, since the page control table 4a designated by the  
overlay pointer 2b is empty, the format image stored

1 in the overlay format information memory 5a is  
registered in the page control table 4a as shown in  
Fig. 3B.

5 Upon completion of the preparation of the page  
buffer for printing by the reception of the print data  
for the first face, the content of the overlay pointer  
2b, or the top address of the page control table 4a set,  
as the address of the page information to be overlaid  
in the first face, in the page control table 4a for the  
10 first face.\* Then a state shown in Fig. 3C is reached  
when an instruction is processed for starting the  
registration of a format to be overlaid in the second  
face and thereafter. More specifically, the temporary  
storage pointer 2a is replaced by the overlay pointer  
15 2b designating the page control table 4a of the first  
face, by the exchange of the top address of the page  
control table 4a designated by the overlay pointer 2b  
with that of the page control table 4b designated by  
the temporary storage pointer 2a. In this state the  
20 storage flag (set in the flag area 2c) is turned on.

The overlay information to be overlaid in the  
second face and thereafter is stored, as shown in  
Fig. 3D, in the empty page control table 4b designated  
by the overlay pointer 2b. After the reception and  
25 preparation of the data of the second face, the top  
address of the page control table 4b designated by the  
present overlay pointer 2b is set as the overlay page

1 information in the page control table 4b constituting  
the page control table of the second face. Then, after  
the discharge of a sheet on which the data for the first  
and second faces are printed, the state of the storage  
5 flag is checked. If it is on, it is cleared since the  
overlay information in the page control table 4a  
designated by the temporary storage pointer 2a is no  
longer necessary, and there is thus deleted the  
information of the page buffer linked with the page  
10 control table 4a designated by the temporary storage  
pointer 2a. Thus the information of the one of the page  
buffers is cleared as shown in Fig. 3E, whereby a state  
shown in Fig. 3B is reached.

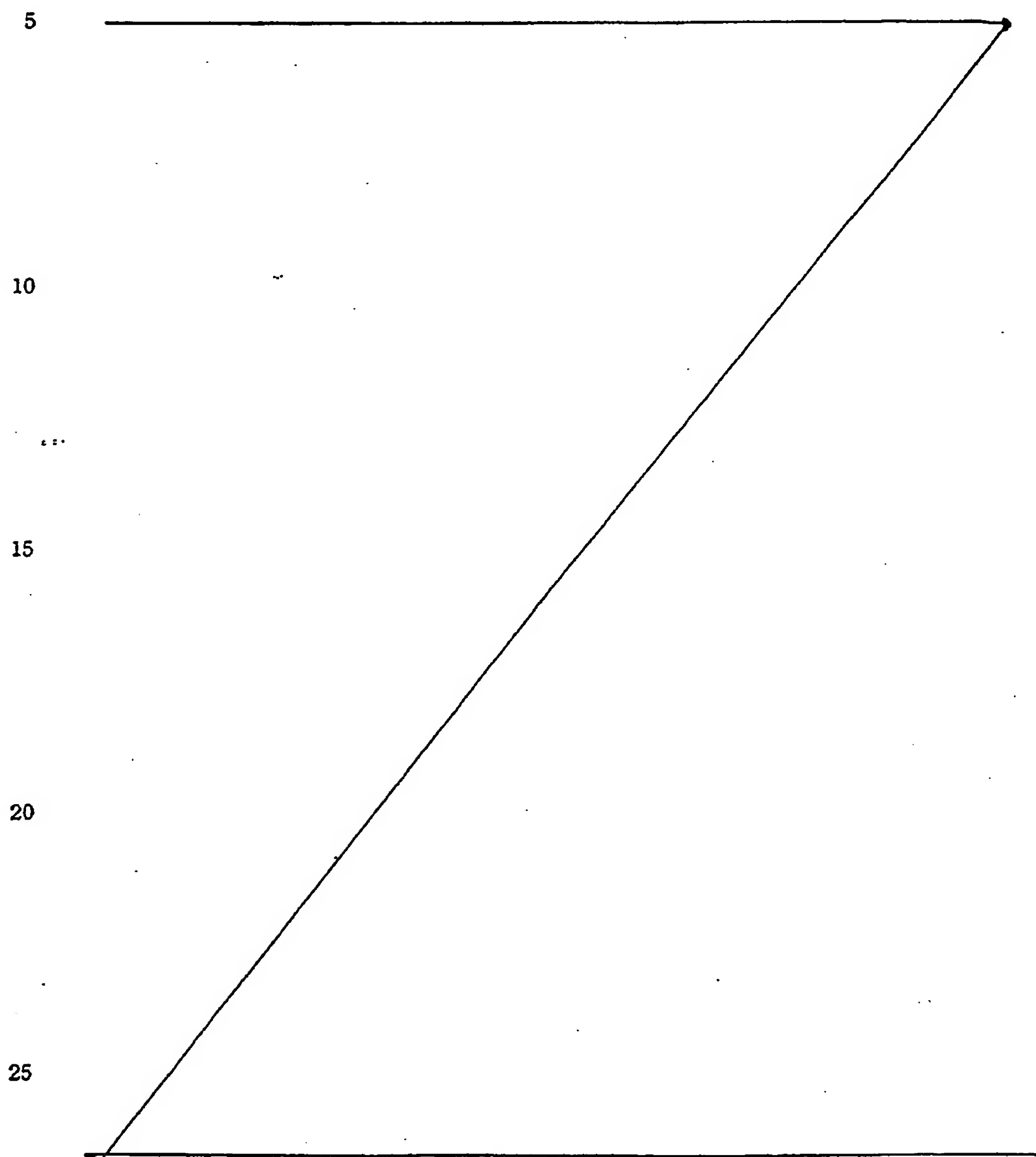
The above-mentioned storage flag is not only  
15 provided for the deletion of the page buffer. If an  
overlay registration is conducted prior to the reception  
of the print data of the second face in a state shown  
in Fig. 3D, there is lost the previously stored overlay  
information. In order to prevent such situation if  
20 an overlay registration is made prior to the reception  
of the data of the second face and if the storage flag  
is on in such state, the latest registered page control  
table 4b designated by the present overlay pointer 2b  
is erased, and a new page control table 4b is prepared.

25 In the following there will be explained the  
overlay form registration and the sheet discharge  
according to the present invention, with reference



1 to Figs. 4 and 5.

Fig. 4 is a flow chart showing an example of the overlay form registration according to the present invention, wherein (1) to (7) indicate process steps.



1           At first CPU 1 executes the initialization of  
flags prior to the registration (step 1), and  
discriminates whether the state is immediately before  
the preparation of the data for the second face (step 2).  
5   If not, the sequence proceeds to a step (7). If  
affirmative, the CPU 1 discriminates whether the  
overlay mode is used in the first face (because, even  
when overlay information is registered, there may be a  
case in which the instruction for overlay in the first  
10 face is not given so that storage is not necessary)  
(step 3). If said discrimination turns out negative,  
the sequence proceeds to the step (7). If it turns out  
affirmative, the CPU turns on the storage flag in order  
to execute the storage (step 5), then exchanges the  
15 content designated by the current overlay pointer 2b  
with that designated by the temporary storage pointer 2a  
(step 6), and executes deletion if the overlay information  
is already linked to the page control table designated  
by the overlay pointer 2b, thereby enabling registration  
20 (step 7).

Fig. 5 is a flow chart showing an example of the  
sheet discharge process of the present invention, wherein  
(1) to (3) indicate process steps.

At first the CPU 1 discriminates the state of  
25 the storage flag (step 1), and, if it is off, the process  
is terminated. If it is on, the CPU turns off the  
storage flag (step 2), then deletes the page information

1 in the page control table designated by the temporary  
storage pointer 2a (step 3), and terminates the process.

In the foregoing there has been explained the  
temporary storage of the overlay form information in  
5 order to prevent alteration therein, in case of form  
overlays on both faces, but the present invention is  
likewise applicable to the two-side printing of  
externally registered characters.

As an example, let us consider a case of  
10 registering a character "(2)" for the first face, under  
a code "7777<sub>H</sub>". If a character "(C)" is externally  
registered for the same code "7777<sub>H</sub>" immediately before  
the printing of the second face, all the characters "(2)"  
on the first face are altered to "(C)".

15 However, different externally registered  
character patterns can be printed on both faces of the  
recording medium with a same code, by permitting the  
existence of the character "(2)" registered for the  
first face and the characters "(C)" registered for the  
20 second face under a same code. After the sheet discharge,  
there is deleted the externally registered character  
patterns (2) only, that has become unnecessary.

In the following there will be explained the  
data flow in another embodiment of the present invention,  
25 with reference to Fig. 6. Various data, such as  
character code data or data on the number of copies,  
sent for example from a host computer is supplied through

1 an input unit 101 to an interpretation/storage unit 102,  
in which the input data are discriminated for example as  
character code data, data on the number of copies, data  
on size etc. and are stored in respective areas of a  
5 page buffer 103. The character code data read from the  
page buffer 103 are converted into dot patterns in a  
development control unit 105, based on a font pattern  
stored in a font pattern storage unit 104, and are  
stored in a bit map memory 106. The dot patterns read  
10 from the bit map memory 106 are converted into video  
signals in an output control unit 107, and are supplied  
to a printing engine unit 108. Said engine unit 108 is  
for example a laser beam printer utilizing a laser and  
an electrophotographic process in combination, wherein  
15 said video signals are supplied to a laser driver,  
thereby activating said laser and effecting the printing  
operation.

Fig. 7 is a block diagram of a control unit for  
realizing the data flow shown in Fig. 6, wherein  
20 equivalent components to those in Fig. 6 are represented  
by same numbers. The functions of the interpretation/  
storage unit 102, development control unit 105 and  
output control unit 107 are performed by a CPU 109.  
The buffer memory 103 and the bit map memory 106  
25 correspond respectively to areas 110b, 110c of a RAM 110.  
The buffer memory area 110b, is so constructed as to be  
capable of storing data of plural pages. There are

1 further provided a page control table area 110a, and  
an area 110b for various flags and pointers.

Fig. 8 illustrates the relationship between the  
page control table and the page buffer.

5 The data sent from the host apparatus are either  
data for ordinary page or those for overlay, and the  
method of storage in the printing apparatus is made  
different accordingly. For the data of ordinary page,  
the page buffer storing the print data is controlled by  
10 the page control table for ordinary page.

On the other hand, for the data of overlay page,  
the overlay print data are stored in the page buffer  
under the control by the overlay page control table.

In case of overlaying the overlay data on an  
15 ordinary page, the ordinary page is linked with the  
overlay page, as shown in Fig. 9, by storing the address  
of the page control table for overlay indicated by the  
overlay pointer, in the pointer for the overlay page  
control table, included in the page control table for  
20 ordinary page.

If overlay information is further registered in  
the above-mentioned state (prior to the reception of  
data of the second ordinary page), the overlay information  
for the first ordinary page becomes altered, as the  
25 content of the overlay page control table indicated by the  
overlay pointer is replaced. For this reason, the flag is  
turned on to exchange the page control table designated by  
the overlay pointer and that designated by the temporary

1 storage pointer, whereby the overlay pointer designates  
the empty page control page while the temporary storage  
pointer retains the page control table containing the  
previous overlay information. In this manner the  
5 above-mentioned registration is rendered possible.  
After said registration, if there is an instruction to  
overlay the overlay information on the second ordinary  
page, the newly registered overlay information is linked.

The printing process is started after the print  
10 data for two pages are prepared. The overlay information  
and the ordinary data for the second face are developed  
in the bit map memory area, from which said data are  
read and printed on the second face of the recording  
medium. Then the overlay information and the ordinary  
15 data for the first face are developed in said bit map  
memory area and printed on the first face of the  
recording medium. After the recording medium is  
discharged, the page buffer of the overlay page control  
table designated by the temporary storage pointer is  
20 released (flag off).

The overlay form registration and the sheet  
discharge mentioned above are similar to those already  
explained in relation to Figs. 4 and 5, and will not,  
therefore, be explained further.

25 The above-explained control provides advantages  
of preventing the alteration or loss of the already  
registered overlay information by the new registration

1 of overlay information, and achieving precise overlaid  
printing of the print information and format information  
specific to each print face.

The present invention is not limited to the  
5 foregoing embodiments but is subject to various  
modifications within the scope and spirit of the  
appended claims.

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1    WHAT IS CLAIMED IS:

1.    A recording control apparatus comprising:  
input means for entering data from an external  
equipment;

5            first memory means for storing format data;  
output means for outputting the data entered  
from said input means and the format data stored in  
said first memory means in overlaid manner; and  
second memory means, at the storage of new  
10    format data in said first memory means, for storing  
previous format data.

2.    An apparatus according to claim 1, further  
comprising first designating means for indicating said  
15    new format data, and second designating means for  
indicating said previous format data.

3.    An apparatus according to claim 2, wherein,  
at the first storage of format data, said first  
20    designating means is adapted to designate said first  
memory means, and, at the succeeding storage of said  
new format data, said first designating means is  
adapted to designate said second memory means while  
said second designating means is adapted to designate  
25    said first memory means.

4.    An apparatus according to claim 1, wherein



the format data stored in said first and second memory means are recording data for respectively different faces of a recording material.

5        5.    Recording apparatus for recording first printing data and overlay data, comprising means for enabling entry of sets of overlay data in series whereby a first entered set of overlay data may be retained whilst a second entered set of overlay data is  
10        executed.

6.    Apparatus as claimed in claim 5, wherein said apparatus is capable of double sided recording and different sets of overlay data may be employed for  
15        recording on each side.

7.    Recording apparatus arranged, constructed and adapted to operate substantially as hereinbefore described with reference to Figure 1, or Figure 7, or  
20        Figures 1 to 3E, or Figures 1 to 3E, 4, 5 and/or 6, or Figures 7 and 8, with or without the description of Figures 9 and/or 10.

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